OPPORTUNITY #47

WHAT IF GENETIC SCREENING WAS STANDARD?

SCREENING FOR GOOD

Comprehensive non-invasive genetic screening, before pregnancy and for embryos, enables the prevention of debilitating congenital conditions

WHY IT MATTERS TODAY

The cost of mapping an individual's genetic sequence is falling fast.

Thanks to technological, scientific and operational advances, the cost of deciphering an entire human genome has dropped by an order of magnitude from $10,000 in 2011 to about $1,000 today.[471]

The global market for personalised medicine is growing rapidly, generating $44 billion in revenues in 2016 to a projected $140 billion by 2026.[472] The linked direct-to-consumer genetic testing market is predicted to grow at around 17% over the coming decade as awareness and acceptance of personalised medicine increases on a global level.[473]

Despite advances in genetic testing, around 6% of children born globally have a serious genetic or partially genetic birth defect. Gulf Cooperation Council (GCC) countries have a particularly high incidence, ranging from 7.3% to over 8%.[474]

The Centre for Arab Genomic Studies has identified 1,890 genetic diseases in the Arab population (based on the 23 countries' demographics tested by the Centre).[475] One of those genetic diseases is Diabetes Mellitus. According to the International Diabetes Federation (IDF), 55 million adults aged 20–79 were registered as diabetic in the Middle East and North Africa (MENA) in 2019.[476] This number is expected to double to 108 million by 2045.[477]

SECTORS

EDUCATION · HEALTH & HEALTHCARE

THE OPPORTUNITY TOMORROW

Genetic testing is likely to grow, particularly if it is non-invasive. Advances in genome sequencing and gene editing techniques make it feasible to screen and potentially treat all foetuses and babies for congenital conditions, minimising negative consequences for life quality or health.

It will also be possible to screen parents to exclude genetic conditions in their children during pre-implantation diagnostics as part of in vitro fertilisation.[478, 479] Dozens of specialist companies have been established in this field over the past decade, and many more will emerge. Combined with solutions for communicable diseases, genetic screening can significantly reduce childhood mortality, which in the Middle East stands at 1.8% according to UNICEF.[480]

Genetic screening prompts intense ethical and scientific debate. Scientific governance is being developed[481] but societies are nonetheless faced with sensitive choices about how far-reaching and comprehensive screening should be allowed to go as gene editing technologies advance. Where medical intervention is available to correct for congenital conditions – such as cystic fibrosis or sickle cell anaemia – screening results in healthier babies, extends lives and alleviates the suffering of children and parents.

BENEFITS

The further eradication of congenital conditions and genetic predispositions to other conditions results in children getting fewer illnesses and drives a population-wide increase in longevity. Lifetime healthcare costs reduce, leading to an increase in life satisfaction.

RISKS

The potential risk of extreme screening and editing for certain ‘cosmetic’ or presumed ‘intellectual’ characteristics raises ethical questions about the rights of children and parents and unintended harm to future generations.

UNINTENDED CONSEQUENCES

Attitudes could evolve towards lower social acceptance of differences and greater acceptance of eugenic tendencies.